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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/695,415	10/29/2003	Hidenori Kawanishi	204552030500	5623

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EXAMINER	
VAN ROY, TOD THOMAS	

ART UNIT	PAPER NUMBER
2828	

DATE MAILED: 06/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/695,415	KAWANISHI ET AL.	
	Examiner	Art Unit	
	Tod T. Van Roy	2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05/31/2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments, see Remarks, filed 05/31/2006, with respect to the rejection(s) of claim(s) 1-26 under USC 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of newly found prior art.

The examiner agrees with the applicant that the combination of an existing doping scheme with a certain active layer material being used with another active layer material with a different doping scheme is not expressly obvious.

The examiner also feels that the Fukunaga '584 reference is valid as it describes InGaAsP based active material in a semiconductor laser.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-3, 10-13 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukunaga et al. (EP 0 920 096 A2, submitted by applicant) in view of Yoshida et al. (US 2002/0041613).

With respect to claims 1-3, Fukunaga teaches a semiconductor laser device comprising: a substrate (fig.1 #1, GaAs)); a first conductivity-type (denoted as n) lower clad layer deposited (fig.1 #2) on the first conductivity-type semiconductor first conductivity-type semiconductor substrate; a quantum well active layer deposited on the first conductivity-type lower clad layer (fig.1 #5, non-Al, InGaAsP); and a second conductivity-type (denoted as p) upper clad layer (fig.1 #8) deposited on the quantum well active layer, wherein the quantum well active layer comprises at least two barrier layers and at least one well layer, and the barrier layers and the well layers are alternately stacked ([0017]), and the emitted light to be between 760nm and 800nm ([0104]). Fukunaga does not teach the active layer to be doped a second (p) conductivity type. Yoshida teaches a semiconductor laser device having an InGaAsP active region ([0047]) wherein the active region is taught to be p doped ([0035] Zn, [0034] 1E17cm-3). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser and InGaAsP active material of Fukunaga with the doped InGaAsP active laser material of Yoshida in order to reduce the series resistance and thermal impedance of the laser device (Yoshida, [0033]).

With respect to claim 10, Fukunaga and Yoshida teach the laser device outlined in claim 1, but do not teach the use of the laser device as the source in an optical disk unit. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the laser device of Fukunaga and Yoshida in an optical disc unit as outputted wavelength regime is well known for use in optical disc technologies.

A reference noted, but not relied upon for this rejection is Shiomoto et al. (US 6456635) that speaks of this wavelength regime being useful for optical discs (col.1 lines 20-54).

With respect to claims 11-13, Fukunaga teaches a semiconductor laser device comprising: a substrate (fig.1 #1, GaAs)); a first conductivity-type (denoted as n) lower clad layer deposited (fig.1 #2) on the first conductivity-type semiconductor first conductivity-type semiconductor substrate; a quantum well active layer deposited on the first conductivity-type lower clad layer (fig.1 #5, non-Al, InGaAsP); and a second conductivity-type (denoted as p) upper clad layer (fig.1 #8) deposited on the quantum well active layer, wherein the quantum well active layer comprises at least two barrier layers and at least one well layer, and the barrier layers and the well layers are alternately stacked ([0017]), and the emitted light to be between 760nm and 800nm ([0104]). Fukunaga does not teach the active layer to be doped a first (n) conductivity type. Yoshida teaches a semiconductor laser device having an InGaAsP active region ([0047]) wherein the active region is taught to be n doped ([0034] Si, 1E17cm-3). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser and InGaAsP active material of Fukunaga with the doped InGaAsP

active laser material of Yoshida in order to reduce the series resistance and thermal impedance of the laser device (Yoshida, [0033]).

With respect to claim 20, Fukunaga and Yoshida teach the laser device outlined in claim 1, but do not teach the use of the laser device as the source in an optical disk unit. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the laser device of Fukunaga and Yoshida in an optical disc unit as outputted wavelength regime is well known for use in optical disc technologies.

A reference noted, but not relied upon for this rejection is Shiomoto et al. (US 6456635) that speaks of this wavelength regime being useful for optical discs (col.1 lines 20-54).

Claims 21-23 are rejected for the same reasons given above for the rejection of claims 1-3, as these claims describe the manufacturing of the given semiconductor layers. Reference is made to [0017] of Fukunaga, which teaches the given layers to be "deposited".

Claims 24-26 are rejected for the same reasons given above for the rejection of claims 11-13, as these claims describe the manufacturing of the given semiconductor layers. Reference is made to [0017] of Fukunaga, which teaches the given layers to be "deposited".

Claims 2, 4, 12, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukunaga (US 2002/0044584) in view of Yoshida.

With respect to claim 2, Fukunaga teaches a semiconductor laser device comprising: a substrate (fig.3 #51, GaAs)); a first conductivity-type (denoted as n) lower clad layer deposited (fig.3 #52) on the first conductivity-type semiconductor first conductivity-type semiconductor substrate; a quantum well active layer deposited on the first conductivity-type lower clad layer (fig.3 #55, non-Al, InGaAsP); and a second conductivity-type (denoted as p) upper clad layer (fig.3 #64) deposited on the quantum well active layer, wherein the quantum well active layer comprises at least two barrier layers and at least one well layer, and the barrier layers and the well layers are alternately stacked ([0055]). Fukunaga does not teach the active layer to be doped a second (p) conductivity type. Yoshida teaches a semiconductor laser device having an InGaAsP active region ([0047]) wherein the active region is taught to be p doped ([0035] Zn, [0034] 1E17cm-3). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser and InGaAsP active material of Fukunaga with the doped InGaAsP active laser material of Yoshida in order to reduce the series resistance and thermal impedance of the laser device (Yoshida, [0033]).

With respect to claim 12, Fukunaga teaches a semiconductor laser device comprising: a substrate (fig.3 #51, GaAs)); a first conductivity-type (denoted as n) lower clad layer deposited (fig.3 #52) on the first conductivity-type semiconductor first conductivity-type semiconductor substrate; a quantum well active layer deposited on the first conductivity-type lower clad layer (fig.3 #55, non-Al, InGaAsP); and a second conductivity-type (denoted as p) upper clad layer (fig.3 #64) deposited on the quantum well active layer, wherein the quantum well active layer comprises at least two barrier

layers and at least one well layer, and the barrier layers and the well layers are alternately stacked ([0017]). Fukunaga does not teach the active layer to be doped a first (n) conductivity type. Yoshida teaches a semiconductor laser device having an InGaAsP active region ([0047]) wherein the active region is taught to be n doped ([0034] Si, 1E17cm-3). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser and InGaAsP active material of Fukunaga with the doped InGaAsP active laser material of Yoshida in order to reduce the series resistance and thermal impedance of the laser device (Yoshida, [0033]).

With respect to claims 4 and 14, Fukunaga further teaches a guide layer made of AlGaAs material to be interposed between the active layer and the upper and lower cladding layers ([0055-58], fig.3 #53/63).

With respect to claims 5 and 15, Fukunaga and Yoshida teach the laser device outlined in the rejections to claims 4 and 14, but do not teach the AlGaAs material to incorporate greater than 0.2 Al (taught to be equal to 0.2, [0055]). It would have been obvious to one of ordinary skill in the art at the time of the invention to adjust the Al ratio higher than the stated 0.2 level as a result of routine optimization of the existing layers taught by Fukunaga. (see MPEP 2144.05 II A - "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)).

Claims 6-9 and 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukunaga and Yoshida and further in view of Fukunaga (US 2002/0044584).

With respect to claims 6-9, Fukunaga and Yoshida teach the device outlined in the rejection to claim 2 above, but do not teach the well layer to have compressive strain at or below 3.5%, or the barrier layers to have tensile strain at or below 3.5%. Fukunaga '584 teaches an InGaAsP active region wherein the quantum well is compressively strained below 3.5% ([0013] product of strain and thickness taught to be .25nm or *smaller*), while the barrier layers are tensile strained below 3.5% ([0015] product of strain and thickness taught to be .25nm or *smaller*). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser device of Fukunaga and Yoshida with the strained layers of Fukunaga '584 in order to improve threshold current and reliability (Fukunaga '584, [0033]).

With respect to claims 16-19, Fukunaga and Yoshida teach the device outlined in the rejection to claim 12 above, but do not teach the well layer to have compressive strain at or below 3.5%, or the barrier layers to have tensile strain at or below 3.5%. Fukunaga '584 teaches an InGaAsP active region wherein the quantum well is compressively strained below 3.5% ([0013] product of strain and thickness taught to be .25nm or *smaller*), while the barrier layers are tensile strained below 3.5% ([0015] product of strain and thickness taught to be .25nm or *smaller*). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser device of Fukunaga and Yoshida with the strained layers of Fukunaga '584 in order to improve threshold current and reliability (Fukunaga '584, [0033]).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tod T. Van Roy whose telephone number is (571)272-8447. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TVR

MINSUN OH HARVEY
PRIMARY EXAMINER